Questions and clarifications needed to the EE/CA Report for Johnny M Mine –Hecla submittal of December 11, 2014

EPA and its subject matter experts have conducted a review of the referenced document. Below are the questions and clarifications needed by the EPA to accept the EE/CA for the Johnny M mine Site. For convenience, the comments etc. have been divided into engineering and radiological sections.

Engineering

Section 2.4.2: this section seems to have been copied from the ITASCA report that is attached to this report. There is a discrepancy on the typical hydraulic conductivity of a compacted clay liner. The ITASCA report says 1 x 10-7cm/s and the EECA says 1 x 10-6 cm/s. We would agree that 1 x 10-7 is a more typical number, although at this point what will matter is the testing of the actual materials and the modelling of the ET cover. The lower this number the thinner the radon barrier will need to be, but it may increase the sand layer thickness. Please review calculations and adjust if necessary or at least be aware that this will be a possible modification during construction to ET cover radon attenuation goals.

Section 2.6: third bullet on page 12; it is unclear how the quantities were calculated for each of the cleanup criteria. For example in the designated areas, how deep will the cleanup need to be? Are some areas deeper than others? Figures 6 and 7 do not show depths. Are the excavation depths an average over a certain area? When calculating the volume of contamination, is the depth effected by the cleanup criteria or just the area, or is it both? Some areas are in deep arroyos; has consideration been given to the difficulty of excavation in the arroyos? Please provide additional information and clarification for the above.

Section 3: the conceptual model discussed in the section and shown on Figure 8 does not address surface water transport during rain events, and the impact on downstream receptors. Also for the onsite disposal alternative, two potential sites are identified. What is the area of each site and to what depth will the consolidation and disposal cell be excavated? Also, shown is a 3 ft. sandy cover. Where will this material come from? On-site or off-site? Based on our knowledge of the Site, there is a limited amount of appropriate sandy material present. Have borrow areas for sand and rock been identified, and tested "clean", as excavation at the disposal site may not provide the amount of material required? Please provide additional information and clarification for the above.

Section 5.3.2: page 25; the discussion on the ET cover modelling, although understood to not be a final design, should discuss how the slope of the final cover will impact the time and amount of rainfall that will infiltrate. For example 5:1 slopes will runoff faster than a 10:1 (the range shown on Figure 15). Additionally by assuming 1.1 x10-3 cm/s conductivity of the sand layer may not be conservative but just the opposite. A lower conductivity would result in a longer retention of infiltrated water and thus could result in more infiltration. The same could be true for the conductivity of the clay layer. By assuming a conductivity of 1.3 x 10-4 cm/s, the model will

calculate infiltration and transpiration, whereas a lower conductivity would not allow infiltration or transpiration at the same rate. Please review design calculations and provide additional information and clarification for the above.

How was the period of 12 years selected as the time period for inspections? Please provide rational.

Section 5.4.3: there is good consistency between each of the estimates, therefore the estimates represent a fair comparison of the alternatives. However, based on our experience, it appears that some of the $/unit values are low. For example a construction superintendent for ~$51/hr is low and does not take into consideration travel and per diem for a remote site like this. It also believe that the $/unit values for excavation and transport are low for a site like this where equipment and operators will not be readily available. Also there should be cost associated with drilling and geotechnical soil characterization at the potential disposal sites and borrow sites that are not included in the cost estimate. Please review projected budget numbers/rates and provide additional information and clarification for the above.

Table 3: there are 2 values for Ksat at 95% compaction. We are assuming one is beginning of test and one is end of test, but it is not clear. Also how were these tests run? What ASTM test was followed? There is a significant change in the Ksat for a very minor change in density. What is the explanation for this significant change? It appears that at the beginning of the test, the samples may not have been saturated. Please review procedure and results, and provide additional information and clarification for the above.

Figures (general): the figures are hard to compare, as they all have a different scale, and the photos used as background are difficult to see or are unreadable. Please standardize scales and address resolution issues.

Figures (specific): it would seem based on figure 5, that sampling of the arroyos and ditches as they cross NM605 would be a reasonable assumption to show that no contamination has left the site. Also, figure 2 shows the historic drainage canal; however there appears to be no sampling in this area. Since this was an unlined ditch, it would seem reasonable to assume that contamination would be in this area, as significant discharge occurred through this ditch. Also, the gamma exposure rates in that area seem to be elevated, yet no samples were taken and no excavation is indicated in that location. In the drainage areas contamination may be at depth and covered by clean soil over time and thus did not show up on the gamma survey, so sampling is needed there. Please provide detailed rational on why these areas were not sampled and fully characterized. If this was an unintended omission, this data gap must be filled.

<u>Radiological</u>

Federal guidance compliance: the EE/CA fails to reference and be compliant with OSWER 9255.6-20, “Radiation Risk Assessment at CERCLA Sites, Q & A”, dated June 2014. This document presents the most current guidance by the EPA for radiological sites. The purpose of this document is to describe how to analyze levels of radioactive contamination and to explain how to assess risks from radiological contamination as part of a remedy for CERCLA sites.

Question 16 of this document provides clear direction that RESRAD is not the preferred code to assess risk at CERCLA sites. Instead, EPA requires the use of the PRG Calculator for this assessment. This position is based on the risk assessment approach for radionuclides used in the PRG calculator is consistent the EPA's approach for chemical risk assessment. Whereas PRG calculator estimates the cumulative risk based on exposure to a steady state concentration over 30 years, RESRAD calculates the risk for each year. By using the conceptual model employed by RESRAD to calculate risk, the result may be inconsistent with the assumptions used in the chemical risk assessment. However, the OSWER guidance document states that if there is a reason on a site-specific basis for using another model, like RESRAD, justification should be provided and a comparative analysis using PRG calculator included. Please provide revisions using the PRG calculator or a rational and justification for continued use of RESRAD to demonstrate compliance with the referenced guidance document.

Risk estimates: Figures 9 & 10 present the risk estimates generated using RESRAD for the Site. These figures depict a dramatic fall-off in risk at about year 800, which is not explained in the text. Please provide additional information and clarification for this effect if you wish to continue using the RESRAD model. See previous comment.

Proposed cleanup criterion: the EE/CA does not present a proposed cleanup criterion, but instead estimates the cost associated with three potential cleanup criteria; 5 pCi/g above background, 2.5 pCi/g above background, and background. Further, there is no discussion on how the Ra-226 concentrations were arrived at. There is clear discussion on CERCLA risk value calculations and how they relate to the assumptions for the three potential receptor groups, all of which is reasonable. EPA believes that a proposed cleanup criterion for each of the proposed potential receptor groups is an integral part of this EE/CA. Please prepare a proposed cleanup criterion based upon a proposed risk from the use of the PRG Calculator (preferred) or RESRAD (with justification) for each of the potential receptor groups. Further, these calculations should compare risk using both the default values in PRG Calculator or RESRAD (with justification), and site-specific values representative of the Johnny M site. Cost estimates may need to be amended if the cleanup values are different that those discussed above.